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GOVERNMENT CHEMISTS RIVAL NATURE
IN MAKING POTENT INSECT KILLERS

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U. S. Department of Agriculture chemists have made in the laboratory compounds that are almost identical in composition with the natural insecticidal compounds in pyrethrum flowers, and are equal -- even superior in some cases -- in insect killing power. Success in this long-range research comes at a time when the need for insecticides that are safe as well as effective in controlling insect pests is especially acute. Pure Food officials now frown on DDT for several uses for which it was recommended originally, particularly on dairy cows.

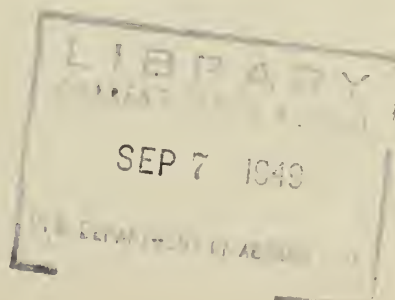
Powdered flowerheads of pyrethrum, which originally grew wild in Persia, have served as a safe, effective insect killer for more than a century -- ever since, as one story goes, a Dalmatian peasant woman found a lot of dead flies around some wilted pyrethrum flowers which she had neglected to throw out from her parlor. These flowers belong to the chrysanthemum family and look like large daisies. American insecticide manufacturers have been importing thousands of tons of them every year, mostly from Japan before World War II but now chiefly from Kenya Colony and the Belgian Congo. The insecticidal preparations made from these flowers are particularly noteworthy for their fast "knock down" of insects and their safety to higher animals. The new synthetic compounds have these properties too.

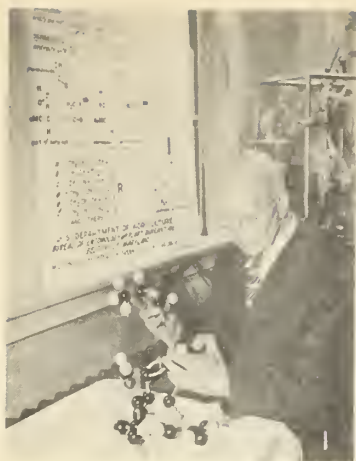
Whether or not they become important commercially, the development of the new pyrethrum synthetics is a notable scientific achievement, says Dr. P. V. Cardon, Agricultural Research Administrator. Back in 1924, he points out, two Swiss chemists - Staudinger and Ruzicka - believed they had determined the chemical structure of the active principles - Pyrethrin I and II - which they isolated from pyrethrum. But attempts to synthesize the pyrethrins according to those formulas were unsuccessful. In 1934, Dr. F. B. La Forge and his associates in the U. S. Department of Agriculture undertook a reexamination of the structure of the pyrethrin molecules. As a result of this study, they made several revisions in the original formulas. Also they discovered and isolated two other compounds very similar to the pyrethrins and named them Cinerin I and II. The next step was to put together from materials readily available in the laboratory one of the cinerins, selected because its structure was least complicated. Early in 1948, M. S. Schechter, another Department chemist, suggested a method for the synthesis of Cinerin I. Using this method, the Department scientists finally succeeded in preparing a synthetic compound - a so-called "stereoisomer" of Cinerin I - that was practically identical in molecular structure with the natural cinerin. Entomological tests with this synthetic show that it is just as toxic to houseflies and has the same "knock down" action. Other closely related compounds have been made also. One of these proved several times as toxic to insects as the combined active natural constituents of pyrethrum flowers.

The method of synthesizing the cinerin compounds, the chemists say, is simple and easily carried out and the starting materials are readily available. The inventors have applied for a patent on this discovery to be dedicated to the free use of the public. A number of commercial companies have expressed great interest in the synthesis and some of them plan shortly to run pilot-plant tests on it.

The pictures on the opposite side of this sheet show some of the steps in the development of the new synthetic insecticidal material in the chemical laboratories of the Bureau of Entomology and Plant Quarantine, at the Agricultural Research Center, Beltsville, Md. Editors and writers may obtain 8 by 10 glossy prints from Press Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

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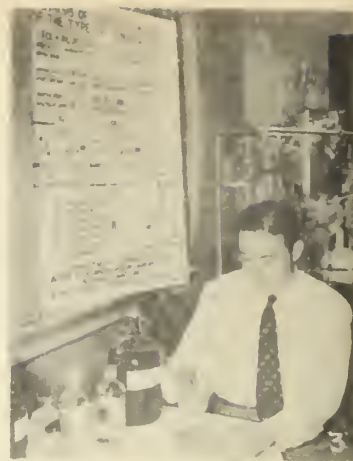




LaForge found the true molecular structure of pyrethrins and cinerins



Flowerheads of pyrethrum, a plant growing wild in the East, contain substances - "pyrethrins" and "cinerins" - that kill insects



Schechter devised a method for synthesizing one of the cinerins



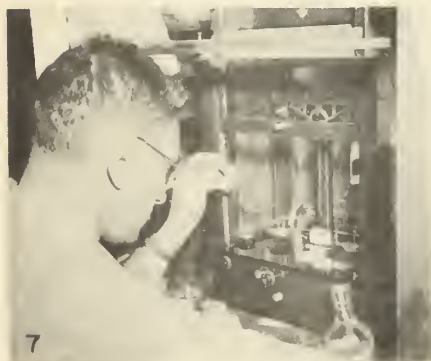
New research on pyrethrum compounds called for review of results of past research



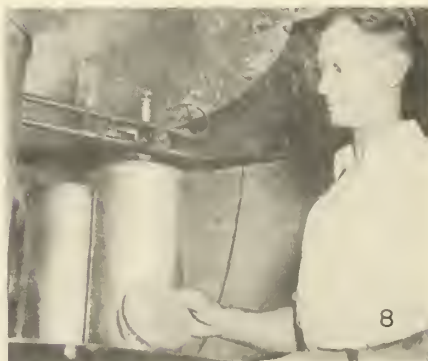
For countless filtrations of solutions containing intermediates for synthesizing compounds having the same composition as the pyrethrins and cinerins



And for countless distillations of these intermediates



N. Green weighs out samples of the new synthetic for tests



Using the turn-table method of testing, Entomologist W. A. Gersdorff shows that the synthetic pyrethrum-like material is just as effective against houseflies as natural pyrethrum.

